

EXPLORATION OF RESILIENCY'S ROLE IN THE RELATIONSHIP BETWEEN
ENDORSED LIFE EVENTS AND STRATEGIES OF EXPLICIT EMOTIONAL
REGULATION

BY

ROLI SHARMA

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Faculty Advisor/mentor(s):

Maya A. Marder, M.S., Clinical-Community Psychology Graduate Student

Dr. Wendy Heller, Ph.D, Department Head, Psychology

Abstract

Emotional regulation plays a significant role in the ways humans manage and cope with emotional experiences. This study utilizes an exploratory mediation-moderation analysis with cross-sectional, between-subject design to explore how self-reported levels of resiliency shape the relationships between endorsed experience of life events and emotional regulation factors: cognitive reappraisal and expressive suppression, in a university sample ($n=445$). Participants were given 13 different scales, including the Life Events Checklist (LEC-5), Emotional Regulation Questionnaire (ERQ), and the Connor-Davidson Resilience Scale (CD-RISC-10), which were used for the present analysis. Results showed that life event endorsement did not prove to have a significant direct effect on resiliency levels, therefore mediation analyses were discontinued. Furthermore, no significant interactions between life event endorsement and resilience levels were revealed for cognitive reappraisal nor expressive suppression, negating a moderation role for resiliency. Follow-up hierarchical regression analyses revealed that both life event endorsement and resilience accounted for significant variance on cognitive reappraisal scores, but neither explained significant variance in expressive suppression. Notably, resiliency accounted for 18% of the variance in cognitive reappraisal. Present results show that resiliency may have a high correlation and direct effect on cognitive reappraisal scores, but does not serve as a mediating or moderating variable. These results suggest that intervention efforts aimed at raising levels of resiliency may help enhance cognitive reappraisal skills regardless of experiencing key life events, thus facilitating in alleviating particular symptoms associated with posttraumatic stress disorders known to be influenced by cognitive reappraisal.

Keywords: emotional regulation, resilience, negative life events

Dedication

I would like to dedicate this work first and foremost to my parents, for giving me everything I have ever wanted, for always supporting and loving me. I will be forever grateful for having the most amazing and encouraging parents in the entire world. Thank you, Mumma and Papa. This work is also dedicated to my third-parent on the same side of the world as me. I couldn't have done it without your constant iMessage games to keep me sane and distracted, Bhaiya. And of course, Medha and Cynthia, for being the most amazing roommates and best friends in the whole world. If I could redo my entire college experience, I wouldn't change a thing about the time I spent with y'all.

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Exploration of Resiliency's Role in the Relationship Between Endorsed Life Events and Strategies of Explicit Emotional Regulation

Emotional Regulation: Cognitive Reappraisal and Expressive Suppression

Available literature has explored the ways different types of life experiences and their impacts influence the capability of humans to regulate their emotions (Bean, Kramers, Forneris, Camiré, 2018; Deng, An, & Cheng, 2019; Flores-Kanter, García-Batista, Moretti, & Medrano, 2019; Grandey & Sayre, 2019; Sperduti et al 2017; Torre & Lieberman, 2018; Thompson, 1991; 1996; Wang, Chen, & Han, 2017). According to Gyurak, Gross, & Etkins (2011), “emotion regulation may be defined as goal directed processes functioning to influence the intensity, duration, and type of emotion experienced.”

Emotional regulation has both implicit and explicit components. Implicit processes can be evoked automatically by environmental stimulus and can transpire without an individual being aware of it (Braunstein, Gross, & Ochsner, 2017; Gyurak, Gross, & Etkin, 2011; Shahane, Lopez, & Denny, 2019; Sperduti et al., 2017). Explicit emotional regulation skills encompass a wide range of cognitive activities. It includes controlled cognitive processes that focus on conscious manipulations and maintenance of information or memories. For example, an individual would demonstrate explicit emotional regulation if they recognize that they are feeling extreme anger or frustration and choose to diffuse the situation by walking away, demonstrating that this individual was able to manage their initial emotion of anger by taking a goal-oriented action. This project focuses on two different types of explicit emotional regulation skills: cognitive reappraisal and expressive suppression.

Cognitive reappraisal, an antecedent-focused process, follows this controlled cognition, and occurs when individuals intentionally reorganize their emotional response to an emotional stimulus (Braunstein, Gross, & Ochsner, 2017). The alterations in such affective processes are often reflected in behavior as well. An example might occur during or after an

argument with a friend. One might re-evaluate the situation and the discussion and view it from the perspective of their friend, and this might reduce some emotional burden for themselves (Megías-Robles et al., 2019).

Another explicit emotional regulation skill is expressive suppression, a response-focused strategy. This ability refers to the concealing of outward emotional expression (Dryman & Heimberg, 2018; Gross, 2014; Preece, Becerra, Robinson, & Gross, 2020). A simple example of this might occur when one's boss criticizes our work extensively. One might suppress their own emotional response to this in order to appear professional (Megías-Robles et al., 2019).

Literature suggests that those with higher levels of expressive suppression are more likely to exhibit symptoms associated with post-traumatic stress (Chen, 2021; Chen et al., 2018; Christensen et al., 2020; Khan et al., 2021; Passardi et al., 2019; Preece et al., 2018; Preece et al., 2020; Wermuth et al., 2021). Thus, types of life events can be predictors of levels of expressive suppression (Balan et al., 2017; Ciuluvica et al., 2019; Gross & Cassidy, 2019; Janiri et al., 2021; Pabel et al., 2020) and psychopathology levels (Borelli et al., 2017; Gross & Cassidy, 2019). In fact, those who had experienced distressing events were more vulnerable to suppressing their expression (Balan et al., 2017; Ciuluvica et al., 2019; Gross & Cassidy, 2019; Janiri et al., 2021; Pabel et al., 2020) Thus, it is predicted that those who had endorsed life experiences will have higher levels of expressive suppression. Research has not found any significant associations between endorsed life events and cognitive reappraisal (Butler et al., 2019; Khan et al., 2020; 2021).

Emotional regulation skills are closely related to resilience (Ghorbani, 2019; Hamby, 2018). Some strategies of resilience, such as those focused on coping, reinforce restructuring stressful situations in a more positive manner (Garland, Gaylord, & Park, 2009; Hanley,

Garland, & Tedeschi, 2017). Reorganizing and restructuring thoughts and emotions is emphasized in cognitive reappraisal skills as well.

Models for Exploring Resilience

Resiliency has been heavily researched and has been explained by a breadth of models. One type of model is the variable focused model, which defines resilience as an interaction between an individual and the environment involving the management of resources following a stressor (Bowes et al., 2010; Burke, 2011; Conger & Conger, 2002; Flaherty et al., 2013; Masten 2014; Treglown, Palaiou et al., 2016). According to Masten (2001), some examples of such resources could include better intellectual functioning and more positive self-concepts, self-efficacy, and intrinsic motivation amongst others. There are several models within the variable-focused paradigm of resiliency, such as the compensatory, mediator, and moderator models of resiliency. This project utilized and analyzed data using the mediation and moderation models of analysis.

In recent mediation and moderation studies pertaining to resilience, there were strong associations found between resilience and both measures of explicit emotional regulation (Dolcos, Hohl, Hu, & Dolcos, 2021; Zarotti, Povah, & Simpson, 2020). There are also claims that increased levels of cognitive reappraisal were significant predictors of resilience levels (Luu, 2021; Mouatsou & Koutra, 2021; Velickovic et al., 2020; Zarotti, Povah, & Simpson, 2020). On the other hand, there exists some converging evidence that expressive suppression has been shown to be negatively correlated with resilience (Cano et al., 2020; Deet, 2018; Dolcos, Hohl, Hu, & Dolcos, 2021; Mouatsou & Koutra, 2021; Zarotti, Povah, & Simpson, 2020).

A mediation statistical model tests how one variable affects the outcome of another variable, by way of a third variable. The term partial mediation is often used to describe the link between resilience and cognitive reappraisal (Dolcos, Hohl, Hu, & Dolcos, 2021; Luu,

2021; Mouatsou & Koutra, 2021; Velickovic et al., 2020; Zarotti, Povah, & Simpson, 2020).

A partial mediation model suggests that other variables, perhaps those that have not been accounted for in the study, play a role in affecting the dependent variable even after the mediator and independent variable have been taken into account (Arrogante & Aparicio-Zaldivar, 2017). In the context of this project, the mediating variable is self-reported resilience scores.

The moderation statistical analysis was also utilized for this study. This model examines the direction and/or strength of the relationship between two variables with consideration of how a third variable may play a role. In the context of this research, the moderator variable is self-reported resilience scores while the relationship being examined is the link between experiencing endorsed life events and explicit emotional regulation.

Moderator variables interact with the independent variable in question to either strengthen or weaken its relationship with the dependent variable (Baron & Kenny, 1986; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; Blair, 2004; Cohen, 2008; Imai, Keele, & Tingley, 2010; Nie, Lau, & Liau, 2011; Tingley, Yamamoto, Hirose, Keele, & Imai, 2014).

Context of this Project

In the context of this project, the risk factor is the number of endorsed life events, with resilience as the mediator/moderator variable, potentially affecting the link between endorsed life events and levels of emotional regulation. Aligning with existing literature, it is hypothesized that higher levels of resilience will be correlated with higher levels of cognitive reappraisal (Dolcos et al., 2021; Luu, 2021; Mouatsou & Koutra, 2021; Velickovic et al., 2020; Zarotti et al., 2020), an emotion regulation skill that has been categorized as an adaptive coping mechanism (Ong & Thompson, 2019). This occurs as restructuring and reorganizing negative thoughts and morphing them into more positive ones presents itself as a coping mechanism for negative experiences. Expressive suppression, on the other hand, is

negatively correlated with resilience (Cano et al., 2020; Deet, 2018; Dolcos, Hohl, Hu, & Dolcos, 2021; Mouatsou & Koutra, 2021; Zarotti, Povah, & Simpson, 2020). In accordance with existing literature, it is predicted that lower levels of expressive suppression will be associated with higher levels of resilience. It becomes likely that resilience plays the role of either a mediator or moderator in the link between endorsed life events and either cognitive reappraisal or expressive suppression.

METHODS

In order to explore the relationship between these two types of explicit emotional regulation, endorsed life events, and resilience, participants were recruited at the undergraduate level at the University of Illinois at Urbana-Champaign. All of the scales are assigned as a survey, where students in certain undergraduate psychology classes participate in studies for class credit. All students were fluent in English. Partaking in this study was done remotely and was completed on personal computers/phones. A total of 497 students participated in our study. Data was eliminated from participants who did not complete the full questionnaire, leaving 455 eligible participants ready for data analysis. The sample consisted of participants who predominantly identified as women (71.2%), although men (25.9%) and other genders (0.66%) did participate. The average age of participants was 19.07 years ($SD = 1.51$).

Scales and Psychometric Evaluations

The following scales were used to assess levels of explicit emotional regulation, resiliency, and the presence of endorsed life events in participants.

Connor Davidson Resilience Scale (CD-RISC-10)

The CD-RISC-10 is a short questionnaire that focuses on evaluating one's cognitive experiences with resiliency. A higher score reflects higher levels of resiliency. It is also known to be indicative of the cognitive process of resiliency, rather than adopting a more

holistic approach. The latter version of the scale consists of 10 items, which are scaled for levels of agreeability on a 5-point Likert scale, ranging from 0 (“not true at all”) to 4 (“true nearly all of the time”). Some sample questions include (1) I adapt when changes occur (2) coping with stress make me stronger (3) most things happen for a reason (4) best effort (5) handle unpleasant feelings. There are two different versions of this scale: one with 25-items and one with 10-items. The latter has been recognized as having improved psychometric properties, and was therefore the version used. The CD-RISC-10 has high rates of external reliability, concurrent, constructive, and predictive validity. (Cheng, Dong, Zhong, & Yao, 2020; Ni et al., 2016; Madewell, Ponce-Garcia, & Martin, 2016; Bezdijan et al., 2017; Madewell et al., 2019; Ruiz Perez & Herrera Rojas, 2019; Velickovic et al., 2020).

Emotional Regulation Questionnaire (ERQ)

The ERQ investigates two explicit emotional regulation skills: cognitive reappraisal and expressive suppression. The ERQ consists of 10-items on a 7-point Likert scale, ranging from 1 (“strongly disagree”) to 7 “(strongly agree)”. There are two scores reported from this questionnaire: one for each explicit emotional regulation strategy. A higher score is reflective of a more frequent and higher use of the corresponding strategy. Some sample items include: (1) When I want to feel more *positive* emotion (such as joy or amusement), I *change what I’m thinking about* (2) I keep my emotions to myself (3) When I want to feel less *negative* emotion (such as sadness or anger), I *change what I’m thinking about* (4) When I am feeling *positive* emotions, I am careful not to express them and (5) When I’m faced with a stressful situation, I make myself *think about it* in a way that helps me stay calm. In the examples above, (1), (3), and (5) pertain to cognitive reappraisal, and (2) and (4) measure expressive suppression. The internal validity of the measures of both of these scales have had consistent support in literature (Spaapen et al., 2014; Cabello et al., 2013; English & John, 2013; Wiltink et al., 2011; Balzarotti et al., 2010; Gross & John, 2003).

Life Events Checklist (LEC-5)

The LEC-5 is a scale accounting for a self-account measure consisting of 17 potential traumatic events in an individual's lifetime. There is no scoring protocol as this scale exists to identify experience rather than assign a numerical value (Gray, Litz, Hsu, & Lombardo, 2004). Participants are asked to respond using a 6-point Likert scale with the following options: (a) happened to me (b) witnessed it (c) learned about it (d) part of my job (e) not sure and (f) doesn't apply. Participants are asked to respond with the above scale to questions such as: (1) natural disaster (for example, flood, hurricane, tornado, earthquake) (2) fire or explosion (3) serious accident at work, home, or during recreational activity (4) physical assault (for example, being attacked, hit, slapped, kicked, beaten up) (5) sexual assault (rape, attempted rape, made to perform any type of sexual act through force or threat of harm). There is significant literature to represent high levels of convergent validity of the LEC-5 with a measure of trauma history. However, it is important to note that the LEC-5 does not serve as a diagnostic tool to assess for the DSM-5's criteria for traumatic exposure (Vaitis, 2020; Weathers et al., 2013). The standard version of the LEC-5 was included to account for individual endorsed life experiences. The LEC-5, however, does not provide a numerical value for the number or intensity of one's experiences, but rather, allows researchers to observe if an individual experienced it, witnessed it, learned about it, etc. Participants were categorized as having experienced an endorsed life event if they self-reported that they had experienced it. Those who had witnessed or learned about it were not utilized in the present analysis.

Data Analysis

Three different types of data interpretation techniques were applied: (1) a mediation analysis, (2) a moderation analysis, and (3) a hierarchical linear regressions. All analyses were completed on the open-source R Statistical Software. It is important to note that present

analyses follow the Baron and Kenny method of mediation (Baron & Kenny, 1986).

Although this method is outdated, we used this to understand the mechanisms of mediation as understood by repeated linear regressions. There are advances that have been made in mediational modeling (Hayes, 2013; MacKinnon et al., 2007; Preacher, 2015; Preacher & Hayes, 2004) and future iterations of this work will utilize path analysis to further analyze the relationships proposed in the current study.

RESULTS

Resiliency did not mediate the relationship between endorsed life events and cognitive reappraisal, nor the relationship between endorsed life events and expressive suppression. As Figures 1 and 2 illustrate, the slope estimates produced from regressing endorsed life events on resilience were found to be insignificant ($\beta \approx -0.08$, $p < 0.05$). The foundation for a mediation analysis is ensuring that the independent variable has a direct effect on the mediator. As this assumption does not hold true for this data, mediation does not remain an appropriate data analysis to conduct. Future calculations in this paradigm would thus be insignificant as well.

Next, the moderation models were conducted. Table 1 reports values for the link of endorsed life events, resilience, and the two types of explicit emotional regulation skills: cognitive reappraisal (CR) and expressive suppression (ES). Model 1 reports the full effect of endorsed life experiences on CR ($\beta \approx -0.38$, $R^2 \approx 0.011$, $p < 0.05$). Model 2 represents the effect of endorsed life events and resilience on CR ($\beta \approx 0.40$, $R^2 \approx 0.19$, $p < 0.001$). Model 3 demonstrates the association between the interaction term and CR ($\beta \approx 0.02$, $R^2 \approx 0.19$, $p < 0.001$). The fourth model removes endorsed life events from the association, and focuses on the relationship between resilience and CR ($\beta \approx 0.40$, $R^2 \approx 0.18$, $p < 0.001$). The difference in R^2 values between Models 1 and 2 from Table 1 is significant ($p < 0.05$). There is a 17.7%

increase in explained variance from Model 1 to 2 in the CR models. This better fit occurred once the effect of resilience, in addition to the effect of endorsed life events considered in Model 1, was taken into account. A follow-up ANOVA test corroborated that Model 2 best fit the data, as is shown in Table 2.

Model 1 also represents the full effect of endorsed life events on ES ($\beta \approx 0.17$, $R^2 \approx 0.35\%$, $p > 0.05$). Model 2 takes a look at the full effect of endorsed life events and resilience on ES ($\beta \approx 0.03$, $R^2 \approx 0.48\%$, $p > 0.05$). Model 3 demonstrates the association between the interaction term and ES ($\beta \approx 0.02$, $R^2 \approx 0.67\%$, $p > 0.05$). The fourth model takes a look at the effect of resilience on ES ($\beta \approx 0.03$, $R^2 \approx 0.12\%$, $p > 0.05$). It is important to note that values associated with ES in Table 1 were not significant. Follow up ANOVA tests (Table 3) revealed that Model 2, which represents the effect of endorsed life events and resilience on CR was found to be significant. The same was not replicated for ES; Table 3 shows the findings from follow-up ANOVA tests.

Discussion

This study aimed to further explore the relationship between endorsed life events and explicit emotional regulation with consideration of resiliency. Results revealed that resilience did not have a mediating or moderating effect on how endorsed life events are associated with either cognitive reappraisal or expressive suppression. Results revealed that the addition of resilience in the model accounted for 17.7% more variance in cognitive reappraisal. Thus, results supported the idea that life event endorsement and resilience may independently associate with cognitive reappraisal, but not expressive suppression.

Previous findings are corroborated by the present study in suggesting that there is a positive correlation between resilience and cognitive reappraisal (Luu, 2021; Mouatsou & Koutra, 2021; Velickovic et al., 2020; Zarotti, Povah, & Simpson, 2020). Results from this study demonstrated an insignificant relationship between resilience and expressive

suppression, as is indicated by a lack of a statistically significant model (Table 3).

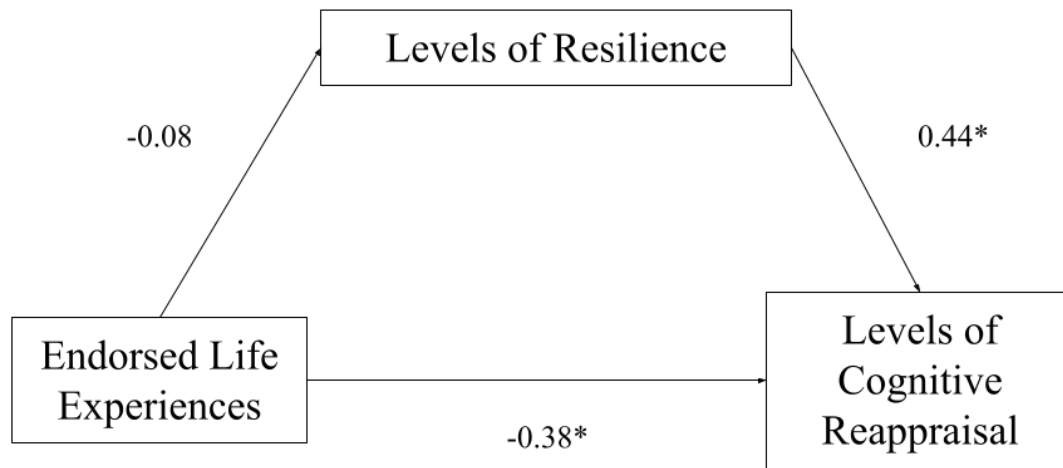
Studies pertaining to endorsed life events, such as after the experience of an earthquake, claim an association between such experiences and levels of cognitive reappraisal (Cano et al., 2020; Deet, 2018; Dolcos et al., 2021; Mouatsou & Koutra, 2021; Zarotti et al., 2020). Higher levels of cognitive reappraisal are associated with fewer symptoms associated with post-traumatic stress. (Boden et al., 2013; Najafi, Yazdanbakhsh, & Moment, 2020; Sistad, Simons, Mojallal, & Simmons., 2021). Additionally, individuals who exhibit symptoms associated with post-traumatic stress are more likely to engage in expressive suppression (Chen, 2021; Chen et al., 2018; Christensen et al., 2020; Khan et al., 2021; Passardi et al., 2019; Preece et al., 2018; Preece et al., 2020; Wermuth et al., 2021). In other words, individuals who have experienced endorsed life events are likely to have higher levels of expressive suppression, and may be more at risk for developing maladaptive coping skills, broadly.

Multiple studies have found a link between disordered eating and suppressing expressions (Millgram & Tamir, 2019; Ortiz, Knaft, Smith, Kalia, 2019; Vuillier, Joseph, Somerville, & Harrison, 2021). Some studies have found that suppression ability is predictive for depressive symptoms (Burton & Bonanno, 2016; Westphal et al., 2010). Furthermore, social anxiety has also been associated with higher levels of expressive suppression and is also associated with a lack of ability to effectively apply cognitive reappraisal skills (Dryman & Heimberg, 2018). Our findings did not reveal any relationship between levels of resiliency and expressive suppression, thus suggesting that it might be more relevant to draw deeper influence from findings related to cognitive reappraisal. The results from this study might help to inform future research into the enhancement of resilience, which may, in turn, positively affect cognitive reappraisal skills of individuals who may be at risk of experiencing symptoms associated with post-traumatic stress.

Certain limitations of this study should be taken into consideration. This study did not take into consideration the plethora of possible confounding variables. There is literature supporting that gender demographics play a role in life events and in emotional regulation scores as well (Sheein et al, 2018). For example, women are more susceptible to experiencing sexual assault on college campuses (Beaver, 2017; Budd, Rocque, & Bierie, 2019; Lopes-Baker, McDonald, Schissler, & Pirone, 2017; Muehlenhard, Peterson, Humphreys, & Jozkowski, 2017), which could have skewed the dataset, especially as the majority were women. Males demonstrate higher resilience than females during adolescent and young adulthood, although this difference is mitigated during mid-adulthood years (Alkim & Çarkit, 2020; Dunbar, Leerkes, Coard, Supple, & Calkins, 2017; Hao & Farah, 2020; Naseem & Munaf, 2020; Prabhu & Shekhar, 2017; Satrya & Corps, 2018; Watson & De Gelder, 2017), which could have caused an unbalance in the results. A closer look at the literature indicates that, while men do have higher resilience scores than women, this statistic no longer holds significance once type of life experience is accounted for (Portnoy et al., 2018). Although gender differences in resilience do exist, recent research has demonstrated that women are more likely to experience different types of trauma than men (Arbona et al., 2021; Fulu et al., 2017; Olff, 2017; Şar et al., 2019; Voth & Edmond, 2018). Thus, this difference in trauma type would have negated differences in resilience scores between men and women. However, this was still a limitation.

Additionally, this study relied on cross-sectional data. One significant limitation of using cross-sectional data is its lack of ability to draw conclusions relating to “effectual” relationships. It is difficult to claim that certain life events “cause” differences in explicit emotional regulation scores. Thus, only correlational inferences can be drawn. Moreover, given the limited ages that are represented in a university sample, generalizability is limited. These noted limitations will be addressed in future drafts.

Figure 1 Standardized Regression Coefficients (Beta Values) for a Mediation Relationship between Levels of Resilience, Endorsed Life Events, and Cognitive Reappraisal



* $p < 0.05$

Figure 2 Regression Coefficients for a Mediation Relationship between Levels of Resilience, Endorsed Life Events, and Expressive Suppression

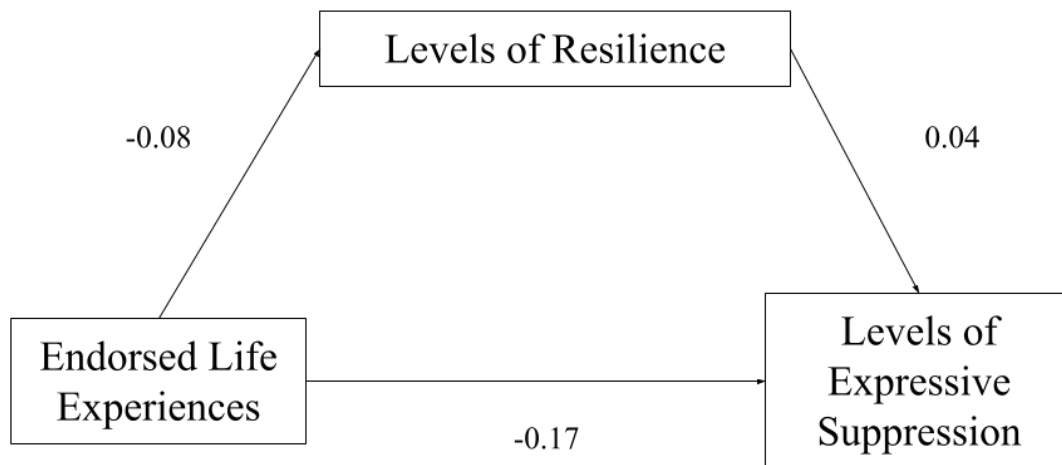


Table 1 A Hierarchical Regression Table of Descriptive Statistical Values for Cognitive Reappraisal and Expressive Suppression

Predictor Variables	<i>Beta</i>	R^2	df	F-statistic	<i>t</i> value	Pr(> t)
COGNITIVE REAPPRAISAL MODELS						
MODEL 1 Endorsed Life Events	-0.38	0.01	443	5.078	-2.25	0.025*
MODEL 2 Endorsed Life Events + Resilience	0.40	0.19	442	51.26	9.82	<2e-16***
MODEL 3 Endorsed Life Events x Resilience	0.02	0.19	441	34.59	-1.09	0.28
MODEL 4 Resilience	0.41	0.18	443	96.52	9.83	<2e-16***
EXPRESSIVE SUPPRESSION MODELS						
MODEL 1 Endorsed Life Events	0.17	0.004	443	1.57	1.25	0.21
MODEL 2 Endorsed Life Events + Resilience	0.03	0.005	442	1.07	0.76	0.45
MODEL 3 Endorsed Life Events x Resilience	0.017	0.007	441	0.99	0.92	0.36
MODEL 4 Resilience	0.03	0.001	443	0.53	0.73	0.47

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 2 ANOVA Findings for Cognitive Reappraisal

Model	Predictors	Res.Df	RSS	df	Sum of Squares	F	Pr(>F)
1	Life Events	443	18667				
2	Life Events + Resilience	442	15326	1	3341.1	96.40	<2e-16 ***
3	Life Events x Resilience	441	15284	1	41.4	1.19	0.28

* p < 0.05; **p < 0.01; ***p < 0.001.

Table 3 ANOVA Findings for Expressive Suppression

Model	Predictors	Res.Df	RSS	df	Sum of Squares	F	Pr(>F)
1	Life Events	443	12408				
2	Life Events + Resilience	442	12392	1	16.03	0.57	0.45
3	Life Events x Resilience	441	12368	1	23.76	0.85	0.36

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